Problem A. Crystal Matryoshkas

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

Dollmaking is a well-known Russian tradition. They are often made of wood, and they nest into each other, starting from the largest, which remains in the exterior, to the smallest one, the only one that is not hollow.

The construction of matryoshkas goes back to 1890 by wood carver Vasily Zvyozdochkin, using a design by Sergey Malyutin. In 1900, the dolls were on a world-level exposition in Paris, and they got the bronze medal. After that, the were popularized throughout Russia, and now they can be found in several sizes, themes, and materials. The matryoshkas which are rarest and hardest to build are crystal matryoshkas, conceived by the famous artist Evgeny Kazantsev Swarowsky. Crystal matryoshkas are extremely delicate and built to be put inside the others.

In this matryoshkas, the weights of the dolls play a key role. Swarowsky found that it was only possible to place inside a doll, others dolls whose sum of weights is smaller than or equal to the weight of the most external doll.

The artist needs your help to manage his growing collection. In particular, me must be able to easily record newly created matryoshkas, to record that a matryoshka got broken, or to estimate the size of a matryoshka to be sold — for the purpose of budgeting.

Initially, there are N matryoshka with weights $w_1, \ldots, w_N$. You must code a program that, considering the initial collection, responds to Q operations of three possible types:

- `+ W ID` means that Swarowsky build a matryoshka of weight `W` e identifier `ID`.
- `- ID` means that Swarowsky broke the matryoshka with identifier `ID`.
- `? ID` means that Swarowsky wants to know the size of the largest matryoshka that contains the matryoshka with identifier `ID`.

All operations will be consistent, that is, there will be no instant when two matryoshka have the same identifier and there will be no operations `-` or `?` with invalid matryoshka identifiers.

Input

The first line has two integers, N,Q, which indicate, respectively, the number of matryoshkas already build and the number of operations you must perform.

The next line has N integers, $w_1, \ldots, w_N$. The ith number, w_i, indicates the weight of the matryoshka with identifier i, which is in the initial collection.

Each one of the next Q line has an operation of the type `+`, `-`, or `?`, as described above.

Constraints

- $1 \leq N \leq 10^5$
- $1 \leq Q \leq 5 \times 10^5$
- $1 \leq W, ID \leq 10^9$

Output

For each query of type `? ID` print a single line, with the size of the largest matryoshka that contains the matryoshka with identifier `ID`.

Examples

standard input	standard output
4 4 3 1 2 1 ? 3 + 4 5 ? 3 ? 1	3 4 3
5 6 5 9 4 1 10 ? 2 - 1 - 4 ? 2 + 13 1 ? 2	3 2 3

Note

Explanation for first example

For the first query `? 3` the answer is 3, since it is possible to form the sequence `1 1 2`, which has three matryoshkas ans has the matryoshka with identifier 3 (and weight 2).

The second operation is `+ 4 5`, it builds a matryoshka of weight 4 and identifier 5.

After this there is a second query, `? 3`, whose answer is 4, sine "1 1 2 4" is a valid matryoshka.

Note that the queried matryoshka is not the most external one in the answer.

The final query is `? 1`, to which the answer is 3, since the largest stacks that include the matryoshka with identifier e (and weight 3) are `1 1 3` or `1 2 3`.

Explanation for second example

First there is a query with matryoshka with identifier 2 and weight 9, and answer to which is 3, and there is more than one possible combination: `1 4 9`, `1 5 9`, and `1 9 10`.

After this there is the removal of matryoshkas with identifiers 1 and 4.

Then there is again the query `? 2`, the answer to which is now 2, with possible solutions `4 9` and `9 10`.

Then there is an added matryoshka with identifier 1 and weight 13. Note that this operation is consistent since at this point there is no matryoshka with identifier 1.

Finally, the query `? 2` is repeated, and the answer is 3, which is the size of the combination `4 9 13`.